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EXAMINER	
CURS, NATHAN M	
ART UNIT	**PAPER NUMBER**
2613	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/642,479	DUAN ET AL.	
	Examiner	Art Unit	
	NATHAN M. CURS	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 28 April 2008 has been entered.

Claim Objections

2. Claims 20, 23 and 28 are objected to because of the following informalities:

In claim 20 lines 1-2, the following changes should be made: "receiving a remainder of the input signal at a second filter", or similar, since claim 19 recites dropping a first signal from the input signal, which results in an altered input signal according to the specification.

In claim 23 lines 1-2, the following changes should be made to be consistent with the specification: "computing the average optical power ~~from~~ using a pre-saved calibration table".

In claim 28 line 8, the following changes should be made: "receiving a remainder of the input signal at a second filter", or similar, since lines 4-5 recite dropping a first

signal from the input signal, which results in an altered input signal according to the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 19, 23-27, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. ("Chung") (US Patent No. 6433864) in view of Ames et al. ("Ames") (US Patent No. 6661817).

Regarding claim 19, Chung discloses a method of monitoring an optical signal to noise ratio (OSNR) in a network, comprising: receiving an input signal at a first filter of an optical add/drop multiplexer (fig. 7, element 502 and col. 7, line 59 to col. 8, line 7, where the channel splitter filters the channels from the multiplexed signal); dropping a first signal from the input signal via a first drop channel of the optical add/drop multiplexer (fig. 7, element 502, first output signal, and col. 7 lines 64-67, where the output signals of element 502 are drop channels); tapping a portion of the first signal and converting the portion of the first signal to a digital signal (fig. 7, first element "OSNR monitor" and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6, line 21 applicable to fig. 7, first element "OSNR monitor"); determining an average

power (fig. 3 element 109 and col. 5 line 66 to col. 6 line 5); calculating a noise spectrum density based upon the digital signal and determining the optical signal to noise ratio from the noise spectrum density and the average power (fig. 3 element 108 and col. 6 lines 14-21). Chung discloses monitoring the average power of the tapped signal (fig. 3, element 109 and col. 6 lines 3-5 and lines 17-21), and discloses A to D conversion for the FFT (fig. 3, element 106 and col. 6 lines 11-16), but aside from the sampling inherent to the A to D conversion, Chung does not disclose further sampling a plurality of data points in the digital signal continuously at a sampling frequency, nor that the noise spectrum density is based upon the sampled points of the digital signal (as opposed to the digital signal directly), nor determining the average power of the sampled points. Ames discloses monitoring optical power using a photodiode followed by an current to voltage conversion followed by A to D conversion of the voltage followed by sampling the digital voltage signal and calculating the average optical power using the sampled digital voltage (fig. 1 and col. 5, lines 32-50 and col. 6, lines 1-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the optical power detection method of Chung with the digital average optical power detection method of Ames, to provide the advantage of being able to store the calculated optical power values in memory for monitoring.

Regarding claim 23, the combination of Chung and Ames discloses the method of Claim 19, but as described above the combination does not compute the average optical power using a pre-saved calibration table. However, Ames does disclose evaluating average optical power results to determine if they are within an expected

tolerance range, by using pre-saved reference coefficients determined during manufacturing and stored in a memory (col. 5, lines 32-50 and col. 6, lines 1-47), which read on pre-saved calibration data stored in a table. It would have been obvious to one of ordinary skill in the art at the time of the invention to use pre-saved reference coefficients in computing the average optical power of the combination, in order to determine if the average optical power results are within an expected tolerance range.

Regarding claim 24, the combination of Chung and Ames discloses the method of Claim 19, wherein the computing of the OSNR is based on the following equation: $OSNR = \frac{P_{sig}}{P_{ase}} \frac{B_o}{R}$ where the symbol "P_{sig}" denotes a signal power of the sampled points, the symbol "P_{ase}" denotes an Amplified Spontaneous Emission (ASE) power of the sampled points, the symbol "B_o" denotes a filter band width, and the symbol "R" denotes a wavelength resolution (Chung: col. 4 lines 40-63).

Regarding claim 25, the combination of Chung and Ames discloses the method of Claim 19, but does not disclose that the plurality of data points is approximately 1024 points. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate the average optical power of the A to D converted continuous voltage using 1024 continuous samples for the calculation, since averaging over any large number of points results in a more accurate average than averaging over a small number of points.

Regarding claim 26, the combination of Chung and Ames discloses the method of Claim 19, wherein the plurality of data points is sampled for a predetermined amount

of time (Ames: col. 6, lines 1-47, as applicable in the combination, where the data points are sampled for an inherent predetermined amount of time).

Regarding claim 27, the combination of Chung and Ames discloses the method of Claim 19, but does not disclose that the predetermined amount of time is 10 ms. However, Chung discloses a WDM system (col. 1 lines 7-15). The Office takes official notice that 10 ms is much longer than the bit period of conventional WDM signals. It would have been obvious to one of ordinary skill in the art at the time of the invention to sample for 10 ms since averaging over any large number of points results in a more accurate average than averaging over a small number of points.

Regarding claim 33, Chung discloses a method of monitoring an optical signal to noise ratio (OSNR) in a network from a dropped channel in an optical add/drop multiplexer, comprising dropping a first signal from an input signal via a first drop channel of the optical add/drop multiplexer (fig. 7, element 502, first output signal, and col. 7 lines 64-67, where the output signals of element 502 are drop channels); tapping a portion of the first signal and converting the portion of the fist signal to a digital signal (fig. 7, first element "OSNR monitor" and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6, line 21 applicable to fig. 7, first element "OSNR monitor"); determining an average power (fig. 3 element 109 and col. 5 line 66 to col. 6 line 5); calculating a noise spectrum density based upon the digital signal and determining the optical signal to noise ratio from the noise spectrum density and the average power (fig. 3 element 108 and col. 6 lines 14-21). Chung discloses monitoring the average power of the tapped signal (fig. 3, element 109 and col. 6 lines 3-5 and lines 17-21), and

discloses A to D conversion for the FFT (fig. 3, element 106 and col. 6 lines 11-16), but aside from the sampling inherent to the A to D conversion, Chung does not disclose further sampling a plurality of data points in the digital signal continuously at a sampling frequency, nor that the noise spectrum density is based upon the sampled points of the digital signal (as opposed to the digital signal directly), nor determining the average power of the sampled points. Ames discloses monitoring optical power using a photodiode followed by an current to voltage conversion followed by A to D conversion of the voltage followed by sampling the digital voltage signal and calculating the average optical power using the sampled digital voltage (fig. 1 and col. 5, lines 32-50 and col. 6, lines 1-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the optical power detection method of Chung with the digital average optical power detection method of Ames, to provide the advantage of being able to store the calculated optical power values in memory for monitoring.

Regarding claim 34, the combination of Chung and Ames discloses the method of Claim 33, further comprising dropping a second signal from the remainder of the input signal via a second drop channel of the optical add/drop multiplexer (Chung: fig. 7 element 502, second output).

5. Claims 20-22 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung (US Patent No. 6433864) in view of Ames (US Patent No. 6661817) as applied to claims 19, 23-27, 33 and 34 above, and further in view of Grann (US Patent No. 6201908).

Regarding claim 20, the combination of Chung and Ames discloses the method of Claim 19, further comprising dropping a second signal from the input signal via a second drop channel of the optical add/drop multiplexer (Chung: fig. 7, element 502, second output signal). However, the combination does not disclose receiving a remainder of the input signal at a second filter of the optical add/drop multiplexer. Grann discloses a compact multiplexer/demultiplexer based on plastic-mold injection and inexpensive cascaded dielectric filters (fig. 1A and col. 2 lines 37-49 and col. 3 line 43 to col. 4 line 26). One of ordinary skill in the art at the time of the invention could have replaced the multiplexer and demultiplexer in the combination of Chung and Ames with the Grann type, and the results would have been predictable; namely, the Grann type multiplexer and demultiplexer would be compact and inexpensive and would perform the same basic function as the original multiplexer and demultiplexer but would achieve the multiplexing/demultiplexing by way of the internal cascaded filters.

Regarding claim 21, the combination of Chung, Ames and Grann discloses the method of Claim 20, wherein the first drop channel and the second drop channel are connected sequentially (Grann: fig. 1A as applicable in the combination).

Regarding claim 22, the combination of Chung, Ames and Grann discloses the method of Claim 20, further comprising tapping a portion of the second signal and analyzing the portion to determine the optical signal to noise ratio (Chung: fig. 7, second element “OSNR monitor” and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6, line 21 applicable to fig. 7, second element “OSNR monitor”).

Regarding claim 35, the combination of Chung and Ames discloses the method of Claim 34, but does not disclose the first and second drop channels are connected sequentially. Grann discloses a compact multiplexer/demultiplexer based on plastic-mold injection and inexpensive cascaded dielectric filters (fig. 1A and col. 2 lines 37-49 and col. 3 line 43 to col. 4 line 26). One of ordinary skill in the art at the time of the invention could have replaced the multiplexer and demultiplexer in the combination of Chung and Ames with the Grann type, and the results would have been predictable; namely, the Grann type multiplexer and demultiplexer would be compact and inexpensive and would perform the same basic function as the original multiplexer and demultiplexer but would achieve the multiplexing/demultiplexing by way of the internal cascaded filters.

6. Claims 28, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung (US Patent No. 6433864) in view of Grann (US Patent No. 6201908).

Regarding claim 28, Chung discloses a method of monitoring an optical signal to noise ratio (OSNR) in a network, comprising: receiving an input signal at a first filter of an optical add/drop multiplexer (fig. 7, element 502 and col. 7, line 59 to col. 8, line 7, where the channel splitter filters the channels from the multiplexed signal); dropping a first signal from the input signal via a first drop channel of the optical add/drop multiplexer (fig. 7, element 502, first output signal, and col. 7 lines 64-67, where the output signals of element 502 are drop channels); tapping a portion of the first signal and analyzing the portion of the first signal to determine the optical signal to noise ratio

fig. 7, first element "OSNR monitor" and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6, line 21 applicable to fig. 7, first element "OSNR monitor"); dropping a second signal from the input signal via a second drop channel of the optical add/drop multiplexer (Chung: fig. 7, element 502, second output signal); and tapping a portion of the second signal and analyzing the portion to determine the optical signal to noise ratio (Chung: fig. 7, second element "OSNR monitor" and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6, line 21 applicable to fig. 7, second element "OSNR monitor"). However, Chung does not disclose receiving a remainder of the input signal at a second filter of the optical add/drop multiplexer. Grann discloses a compact multiplexer/demultiplexer based on plastic-mold injection and inexpensive cascaded dielectric filters (fig. 1A and col. 2 lines 37-49 and col. 3 line 43 to col. 4 line 26). One of ordinary skill in the art at the time of the invention could have replaced the multiplexer and demultiplexer in the combination of Chung and Ames with the Grann type, and the results would have been predictable; namely, the Grann type multiplexer and demultiplexer would be compact and inexpensive and would perform the same basic function as the original multiplexer and demultiplexer but would achieve the multiplexing/demultiplexing by way of the internal cascaded filters.

Regarding claim 31, the combination of Chung and Grann discloses the method of Claim 28, wherein the first drop channel and the second drop channel are connected sequentially (Grann: fig. 1A as applicable in the combination).

Regarding claim 32, the combination of Chung and Grann discloses the method of Claim 28, wherein the optical signal to noise ratio is based on the following equation:

$OSNR = \frac{P_{sig}}{P_{ase}} \frac{B_o}{R}$ where the symbol "P_{sig}" denotes a signal power of the sampled points, the symbol "P_{ase}" denotes an Amplified Spontaneous Emission (ASE) power of the sampled points, the symbol "B_o" denotes a filter band width, and the symbol "R" denotes a wavelength resolution (Chung: col. 4 lines 40-63).

7. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chung (US Patent No. 6433864) in view of Grann (US Patent No. 6201908) as applied to claims 28, 31 and 32 above, and further in view of Ames (US Patent No. 6661817).

Regarding claim 29, the combination of Chung and Grann discloses the method of Claim 28, wherein analyzing the portion of the first signal to determine the optical signal to noise ratio comprises: converting the portion of the first signal to a digital signal (Chung: fig. 7, first element “OSNR monitor” and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6, line 21 applicable to fig. 7, first element “OSNR monitor”); determining an average power (fig. 3 element 109 and col. 5 line 66 to col. 6 line 5); calculating a noise spectrum density based on the digital signal and determining the optical signal to noise ratio from the noise spectrum density and the average power (fig. 3 element 108 and col. 6 lines 14-21). Chung discloses monitoring the average power of the tapped signal (fig. 3, element 109 and col. 6 lines 3-5 and lines 17-21), and discloses A to D conversion for the FFT (fig. 3, element 106 and col. 6 lines 11-16), but aside from the sampling inherent to the A to D conversion, Chung does not disclose further sampling a plurality of data points in the digital signal continuously at a sampling frequency, nor that the noise spectrum density is based upon the sampled points of the

digital signal (as opposed to the digital signal directly), nor determining the average power of the sampled points. Ames discloses monitoring optical power using a photodiode followed by an current to voltage conversion followed by A to D conversion of the voltage followed by sampling the digital voltage signal and calculating the average optical power using the sampled digital voltage (fig. 1 and col. 5, lines 32-50 and col. 6, lines 1-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the optical power detection method of the combination with the digital average optical power detection method of Ames, to provide the advantage of being able to store the calculated optical power values in memory for monitoring.

8. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chung (US Patent No. 6433864) in view of Grann (US Patent No. 6201908) as applied to claims 28, 31 and 32 above, and further in view of Shin et al. ("Shin") ("A novel optical signal-to-noise ratio monitoring technique for WDM networks", Shin et al.; Optical Fiber Communication Conference, 2000; Volume 2, 7-10 March 2000 Pages: 182-184) and further in view of Ames (US Patent No. 6661817).

Regarding claim 30, the combination of Chung and Grann discloses the method of Claim 28, wherein analyzing the portion of the first signal to determine the optical signal to noise ratio comprises: selecting a frequency range (Chung: col. 6 lines 14-16); converting the portion of the first signal to a digital signal (Chung: fig. 7, first element "OSNR monitor" and col. 7, line 59 to col. 8, line 7; and fig. 3 and col. 5, line 51 to col. 6,

line 21 applicable to fig. 7, first element “OSNR monitor”); determining an average power determining an average power (fig. 3 element 109 and col. 5 line 66 to col. 6 line 5); generating a spectrum in the frequency domain utilizing a Fast Fourier Transform (fig. 3 element 107 and col. 6 lines 14-16); generating a noise spectrum density from the spectrum and a frequency range and calculating the optical signal to noise ratio from the noise spectrum density and the average power (col. 6 lines 17-21). The combination of Chung and Grann does not disclose selecting the frequency range based on network traffic protocol and transmission rate. Shin discloses essentially the same method of monitoring OSNR as Chung, and discloses 10 Gb/s data rates in the context of WDM technology and selecting a frequency range based on network traffic protocol and transmission rate (pages 182 section "I. Introduction" and first paragraph of section "II. Experiments", where using the FFT data in the range of 40 ~ 50 kHz for the 10Gbps pattern signal reads on selecting a frequency range based on network traffic protocol and transmission rate). It would have been obvious to one of ordinary skill in the art at the time of the invention to select the frequency range based on network traffic protocol and transmission rate in the combination, so that the FFT information corresponds to the actual network traffic. Also, the combination does not disclose sampling 1024 points in the digital signal continuously at a sampling frequency, nor that the average power and OSNR are determined from the sampled points of the digital signal instead of the digital signal itself. Ames discloses monitoring optical power using a photodiode followed by an current to voltage conversion followed by A to D conversion of the voltage followed by sampling the digital voltage signal and calculating

the average optical power using the sampled digital voltage (fig. 1 and col. 5, lines 32-50 and col. 6, lines 1-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the optical power detection method of the combination with the digital average optical power detection method of Ames, to provide the advantage of being able to store the calculated optical power values in memory for monitoring. Further, it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate the average optical power of the A to D converted continuous voltage using 1024 continuous samples for the calculation, since averaging over any large number of points results in a more accurate average than averaging over a small number of points.

Response to Arguments

9. Applicant's arguments of 28 April 2008 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/NATHAN M CURS/

Examiner, Art Unit 2613